

NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Survey Made of Refractory Metals

The use of refractory materials for structural applications has required the development of unique processing and evaluation facilities incorporating high temperatures and protective or vacuum environments. Through a coordinated government-industry program, high quality sheet alloys of high strength are now available commercially and current laboratory research demonstrates that further improvements in properties will be realized in the future.

A survey has been made reviewing this progress and describing the fundamental characteristics of the most useful of the refractory metals, tungsten, molybdenum, tantalum, and columbium (eliminating those too scarce to be of practical use). These refractory metals' structural applications are reviewed and the special problems they present in manufacture, evaluation, and application are discussed. The unique facilities required for their processing and evaluation, a summary of accomplishments in achieving commercial products, and the present status of the most advanced refractory materials in research and development are presented.

Notes:

1. Complete details of this survey are contained in: *A Decade of Progress in Refractory Metals*, by G. Mervin Ault, 1965, Gillett Memorial Lecture, American Society for Testing and Materials.

Copies of this survey are available from:

ASTM Headquarters
1916 Race Street
Philadelphia, Pennsylvania 19103

2. Inquiries concerning this survey may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B68-10032

Patent status:

No patent action is contemplated by NASA.

Source: G. Mervin Ault
(LEW-10380)

Category 03